POLICY facts

U.S. DEPARTMENT OF ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Strategic Center for Natural Gas

04/2002

IMPACTS OF ALTERNATIVE MANAGEMENT PRACTICES FOR PRODUCED WATER IN THE POWDER RIVER CBM PLAY

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www.netl.doe.gov/scng

Description

Coalbed methane (CBM) development has become a significant source of natural gas in the U.S. During 2000, 1.4 trillion cubic feet (Tcf) of CBM was produced in the U.S., which amounts to about 7-1/2 percent of total production. Arguably, the Powder River Basin is the site of the fastest growing domestic natural gas play – the development of CBM from the Wyodak and Big George coal fairways. Currently, the basin produces 800 million cubic feet per day of CBM and 1.4 million barrels per day of water from 8,000 producing wells. For the most part, these waters are surface discharged and provide beneficial uses for agriculture, stock watering and grasslands.

Photo: MT DEQ

The EPA (Region 8) is conducting a study to support the determination of effluent guidelines representing Best Available Technology (BAT) economically achievable for CBM produced water. Depending on study results and follow-on actions, future beneficial use of produced water may become restricted, increasing costs and limiting the development of natural gas from Rocky Mountain basins. As one might expect, considerable attention is being directed at Powder River Basin operations. Recognizing the potential impacts of EPA's effort on domestic energy production, the Strategic Center for Natural Gas (SCNG) at the U.S. Department of Energy's National Energy Technology Laboratory (NETL) is sponsoring a comprehensive analysis that will examine:

- The underlying CBM resources;
- Future CBM and water production; and
- Impacts of alternative produced water management practices in the Powder River Basin.

Photo: EPA

RELEVANT INVOLVED PARTIES

Federal Agencies

State Governments

Oil and Gas Industry

Environmental Groups

Farmers and Ranchers

Royalty Owners

RELATED LINKS

Bureau of Land Management and Forest Service
http://www.prb-eis.org/

Independent Petroleum Association of Mountain States
http://www.ipams.org

Montana Department of Environmental Quality
http://www.deq.state.mt.us/CoalBedMethane/

Powder River Basin Resource Council
http://www.powderriverbasin.org/

Powder River Coalbed Methane Information Council
http://www.cbmwyo.org/

U.S. EPA (Region 8)
http://www.epa.gov/region08/water/wastewater/npdeshome/cbm/cbm.html

U.S. Geological Survey
http://energy.cr.usgs.gov/oilgas/cbmethane/index.htm

Wyoming Department of Environmental Quality
http://deq.state.wy.us

Wyoming Oil and Gas Conservation Commission
http://wogcc.state.wy.us

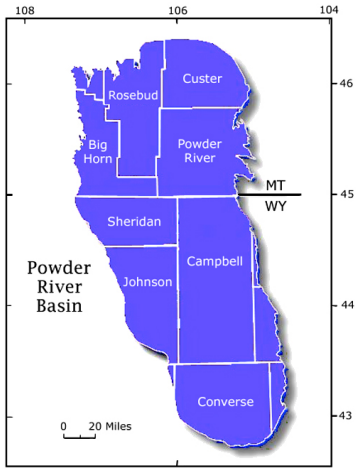
Wyoming State Geological Survey
http://www.wsgsweb.uwyo.edu/

Impacts of Alternative Management Practices for Produced Water in the Powder River CBM Play

Results of SCNG's study are expected in mid-2002. A complementary review of available subsurface water disposal zones in the basin is also being supported by NETL through its National Petroleum Technology Office.

Background

The Powder River Basin of Wyoming and Montana covers a vast area, with only 10% of the basin's CBM potential developed to date. Absent restrictions, the expectations are that natural gas production from this CBM play will continue to grow – and grow significantly. CBM resources are estimated to be about 25 Tcf and there's a real possibility that 50,000 wells will be required to develop the resource. Along with the growth in natural gas production will be growth in produced water, as dewatering of coals is an essential part of CBM development.



After: USGS

The purpose of the "Powder River Basin CBM Development and Produced Water Management Study" is to gain a comprehensive understanding of the energy impacts of alternative water disposal options for this basin. SCNG's study will review the situation in a holistic manner and is designed to provide answers to questions such as:

What quantity of resource would likely be impacted?

How much would tax and royalty receipts likely be reduced?

How much would production costs likely increase?

In addition, the information generated by the Powder River study will assist in defining R&D activities that would help lower the costs of water treatment and disposal, and identify water management strategies (such as centralized disposal facilities) that could be of benefit to not only the producers in the basin but also to ranchers, outdoorsmen, et al.

Significance/Potential Impacts

Should water management options become constrained, CBM operators in the Powder River Basin will need to consider alternatives such as:

- Pre-treatment of the water with 1) chemical additives to reduce the sodium adsorption ratio, and 2) reverse osmosis or other means to reduce total dissolved solids,
- Shallow re-injection to conserve water for future use, and
- Deep re-injection into non-potable water disposal aquifers.

In the end, SCNG's analysis will help to resolve the considerable uncertainties that exist with the costs of these alternative water management strategies and how they would affect the economic viability of fully developing natural gas reserves from the coal seams of the Powder River Basin.